

Name(s): Zempel, Christian

Education Institution(s): Santa Clara University

Major(s)/Degree/Grad Year: Mechanical Engineering/BS/2011

NASA MSFC Mentor: Martin Kress

Org Code/Division or Branch: VP12



Research and Experience

• **Student Research Assistant**, Santa Clara University Office of Institutional

Research (6/10-Present)

- Inventoried Santa Clara University documentation and conducted relevant statistical research
 - Trained additional student and composed extensive instructional procedures for future student employees
 - Worked independently with few instructions and training to trouble shoot and problem solve
- **Project Manager**, Student Hands-on Training II (Summer 2010)
- Led a team of four students who built a balloon-satellite launched out of Boulder, Colorado
 - Designed and built small satellite from the ground up with beacon payload and launched by weather balloon
 - Gained comprehensive “hands-on” introduction to satellite subsystems
- **Design Engineer**, Senior Design for Santa Clara University (9/010-6/11)
- Developed an experimental test bed to test radical concepts for an ergonomic office chair
 - Led conceptual and physical design, and construction for final prototype
 - Worked in a four person interdisciplinary team to produce a prototype
 - Applied technical skills in a new field during rapid conceptual design development stage

Membership and Activities

- Mechanical Engineering Honor Society Pi Tau Sigma (2009)
- Engineering Honor Society Tau Beta Pi (2009) and tutor
- Jesuit Honors Society Alpha Sigma Nu (2011)
- Order of the Engineer (2011)

Honors and Awards

- Graduated Magna Cum Laude (2011)
- Santa Clara University Dean’s List - Engineering (2008-2009, 2009-2010)
- Aerospace Innovation Design Challenge grand prize winner, \$2,000 (2009)
- Santa Clara University Jesuit Ignatian Scholarship (2007)

Title of Poster:

Abstract: Small Spacecraft, Unmanned Aerial Systems, and High Altitude Platforms Initiative

Redstone Arsenal possesses a diverse set of low cost, high altitude platforms that represent future innovative systems solutions for operational, research, and science missions. However, this portfolio of small spacecraft, unmanned aerial systems (UAS), and high altitude platforms and the associated sensors, instruments, operations centers,

test facilities, and ongoing projects are not well known outside of their home organizations, or the Huntsville region. The Small Spacecraft, UAS, and High Altitude Platforms Initiative (HAPI) seeks to inform regional and national leaders about the wealth of assets within the Huntsville Region and their potential to provide low cost tactical and theater system solutions to key customer requirements in the DOD, NASA, NOAA, USDA, and DOE. As part of the Review/Planning Team, I will assess regional capabilities and market/procurement opportunities, as well as make initial recommendations regarding potential system of systems projects and initiatives. A system of systems solution integrates several technological systems to tackle a more complex problem. Such a system of systems could be a cubesat launch-on-demand platform capable of deploying 25 kilograms of payload to low earth orbit for persistent communications or surveillance coupled with a UAS deployed to the same region to provide targeted mapping, insights, or short-term, rapid turnaround capabilities. Future work by the Team includes creating a new decision support tool that matches the optimal platform and underlying capabilities with the customer's mission requirements.

